ABSTRACT

A modular materials characterization apparatus includes a sensor array disposed on a substrate, with a standardized array and contact pad format; electronic test and measurement apparatus for sending electrical signals to and receiving electrical signals from the sensor array; an apparatus for making electrical contact to the sensors in the standardized array format; and an apparatus for routing signals between one or more selected sensors and the electronic test and measurement apparatus. The sensor array is preferably arranged in a standardized format used in combinatorial chemistry applications for rapid deposition of sample materials on the sensor array. The interconnection apparatus and sensor array and contact pad allow measurement of many different material properties by using substrates carrying different sensor types, with only minor modifications if any to the electronic test and measurement apparatus and test procedures. By using a sensor array that is separate from the electronic apparatus, and by including standardized contacting and signal routing apparatuses, the apparatus creates a modular "plug-and-play" system that eliminates the need for multiple materials characterization machines, and eliminates the need for application-specific active circuitry within the sensor arrays themselves. Further, the modular sensor array system can characterize large numbers of material samples rapidly, on the order of at least 50 samples per hour, reducing the time needed for screening of materials libraries.

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